

WHAT IS CLAIMED IS:

1. A fluorescent lamp which does not rely on amalgamative metal to control mercury vapor pressure characterized in that mercury in the lamp is in the form of a zinc amalgam.

2. The lamp of Claim 1 wherein said amalgam is about 40 to 60 weight percent mercury.

3. The lamp of Claim 1 wherein said lamp has a cold spot operating temperature of between about 40° and 60°C.

4. The lamp of Claim 1 wherein said amalgam is in the form of one or more pellets, each with mercury-rich liquid in the intergranular regions.

5. The lamp of Claim 1 wherein said amalgam is binary.

6. The lamp of Claim 1 wherein said amalgam exists in both solid and liquid phases when the lamp is operating and wherein the mercury concentration is less than 50 weight percent in the solid phase and more than 50 weight percent in the liquid phase.

7. A temperature controlled fluorescent lamp having a predetermined amount of mercury sealed therein characterized in that the mercury is in the form of a binary zinc amalgam that is partially in the liquid and partially in the solid phase when the lamp is operating.

8. The lamp of Claim 7 wherein the mercury in said amalgam is between about 40 and 60 weight percent.

9. The lamp of Claim 7 wherein the weight percent of mercury in said amalgam is significantly greater in the liquid phase than in the solid phase.

10. The lamp of Claim 7 wherein the mercury is >90 weight percent in the liquid phase.

11. A temperature controlled fluorescent lamp having a predetermined amount of mercury sealed therein characterized in that the mercury is a solid amalgam at room temperature.

12. The lamp of Claim 11 wherein said amalgam includes zinc.

13. The lamp of Claim 12 wherein said amalgam is binary.

14. The lamp of Claim 13 wherein the mercury in said amalgam is between about 40 and 60 weight percent.

15. The lamp of Claim 14 wherein said amalgam is in pellets with interiors having mercury-rich liquid portions.

16. The lamp of Claim 15 wherein said pellets have an outer shell with a zinc-rich portion.

17. A lamp fill material for a temperature controlled fluorescent lamp characterized in that the fill material is a zinc amalgam.

18. The lamp fill material of Claim 17 wherein said amalgam comprises one or more pellets.

19. The lamp fill material of Claim 18 wherein, at about 20°C, said pellets have an interior with mercury-rich liquid portions.

20. The lamp fill material of Claim 19 wherein said pellets have an outer shell with a zinc-rich portion.

21. The lamp fill material of Claim 20 wherein said pellets are porous so that mercury vapor can diffuse from the interior of the pellets.

22. A lamp fill material for a fluorescent lamp characterized in that the material includes pellets of zinc amalgam.

23. The lamp fill material of Claim 22 wherein the fluorescent lamp is temperature controlled.

24. The lamp fill material of Claim 22 wherein said pellets are uncoated.

25. The lamp fill material of Claim 22 wherein said zinc amalgam is about 5 to 60 weight percent mercury.

26. The lamp fill material of Claim 25 wherein said pellets are each between 0.05 and 25 milligrams in mass.

27. The lamp fill material of Claim 25 wherein said pellets are in a metastable, non-equilibrium state.

28. The lamp fill material of Claim 25 wherein said amalgam further comprises less than 10 weight percent of one or more elements taken from the group consisting of bismuth, lead, indium, cadmium, tin, gallium, strontium, calcium and barium.

29. A method of dosing a temperature controlled fluorescent lamp characterized in that,

the mercury is provided in a zinc amalgam that is a solid below about 40 °C and partially solid and partially liquid at the operating temperature of the lamp; and

the amalgam is introduced into the lamp as a solid.

30. The method of Claim 29 wherein the amalgam is introduced into the lamp in the form of one or more pellets.

31. The method of Claim 30 wherein the pellets are formed by rapid solidification of the amalgam so that each of the

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pellets has a zinc-rich outer shell and an interior with mercury-rich liquid portions.

32. The method of Claim 29 wherein said amalgam is between 40 and 60 weight percent mercury.

33. The method of Claim 29 wherein said amalgam is binary.

34. A method of dosing a fluorescent lamp with mercury without introducing lamp fill material which has a significant effect on the vapor pressure of the mercury when the lamp is operating, characterized in that the method includes,

providing an amalgam that is solid below about 40°C and that does not significantly regulate the vapor pressure of mercury in said lamp; and

introducing the amalgam into said lamp at a temperature below about 40° C.

35. The method of Claim 34 wherein the amalgam is a zinc amalgam.

36. The method of Claim 34 wherein the amalgam is introduced into the lamp in the form of pellets that are in a metastable, non-equilibrium state.

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